AMENDMENTS TO THE CLAIMS

Please amend the Claims as follows. Insertions are shown underlined while deletions are ~~struck through~~. Please add Claims 8-11.

1 (original): An optical processing apparatus comprising a light source part and a light-focusing irradiation means, the optical processing apparatus characterized in that:

the light source part generates ultraviolet light and/or soft X-ray that allows a work to effectively absorb light, by irradiation of a target with laser light focused using a light-focusing optics system; and

the light-focusing irradiation means comprises an optics system to focus the ultraviolet light and/or soft X-ray to high energy density in accordance with the wavelength of ultraviolet light and/or soft X-ray, irradiates the work with said focused ultraviolet light and/or soft X-ray of high energy density in a specified pattern, and processes and/or refines the work.

2 (original): An optical processing apparatus comprising a light source part and a patterning and irradiating means, the optical processing apparatus characterized in that:

the light source part generates ultraviolet light and/or soft X-ray that allows a work to effectively absorb light, by irradiation of a target with laser light focused using a light-focusing optics system; and

the patterning and irradiating means comprises an optics system to focus the ultraviolet light and/or soft X-ray to high energy density in accordance with the wavelength of ultraviolet light and/or soft X-ray, irradiates the work with said focused ultraviolet light and/or soft X-ray of high energy density as a specified patterned beam adjusted to a desired shape, and processes and/or refines the work.

3 (currently amended): The optical processing apparatus according to Claim 1 ~~or 2~~, characterized in that the optics system to focus the ultraviolet light and/or soft X-ray to high energy density in accordance with the wavelength of ultraviolet light and/or soft X-ray is an ellipsoidal mirror, and that, in the light source part, the generation source of ultraviolet light and/or soft X-ray is positioned at one of the two focal points of the ellipsoidal mirror, and the product of the reflectance on the ellipsoidal mirror surface with respect to the wavelength of ultraviolet light and/or soft X-ray reflected by the ellipsoidal mirror and focused on the other focal point, and the solid angle of the ellipsoidal mirror at the light source part, is set sufficiently large.

4 (currently amended): The optical processing apparatus according to Claim 1 ~~or 2~~, characterized in that the optics system to focus the ultraviolet light and/or soft X-ray at high energy density in accordance with the wavelength of ultraviolet light and/or soft X-ray is an ellipsoidal mirror, and that, in the light source part, the generation source of ultraviolet light and/or soft X-ray is positioned at one of the two focal points of the ellipsoidal mirror, and the product of reflectance R on the ellipsoidal mirror surface with respect to the wavelength of ultraviolet light and/or soft X-ray reflected by the ellipsoidal mirror and focused on the other focal point, and angle ϕ specified by Equation 7 below at the light source part viewing therefrom both ends of the ellipsoidal mirror in the long axis direction, is set sufficiently large;

where the symbols used in Equation 7 are defined as follows:

θ: Grazing angle of light emitted from the one of the focal points as it enters the ellipsoidal mirror;

w/f: Ratio of the distance between focal points, or 2f, and the length of the ellipsoidal mirror in the rotating axis direction, or 2w;

α: Angle formed by the "rotating axis of the ellipsoidal mirror" and the "straight line passing the one of the focal points of the ellipsoidal mirror and the end point of the ellipsoidal mirror in the rotating axis direction located closer to said focal point";

β: Angle formed by the "rotating axis of the ellipsoidal mirror" and the "straight line passing the one of the focal points of the ellipsoidal mirror and the end point of the ellipsoidal mirror in the rotating axis direction located farther from said focal point";

[Equation 7]

$$\phi = \alpha - \beta$$
$$= \tan^{-1}\frac{\tan\theta\sqrt{1-\left(\frac{w}{f}\right)^2\cos^2\theta}}{1-\frac{w}{f}} - \tan^{-1}\frac{\tan\theta\sqrt{1-\left(\frac{w}{f}\right)^2\cos^2\theta}}{1+\frac{w}{f}}$$

5 (currently amended): The optical processing apparatus according to Claim 1 ~~or 2~~, characterized in that the optics system to focus the ultraviolet light and/or soft X-ray at high energy density in accordance with the wavelength of ultraviolet light and/or soft X-ray is constituted by one mirror or a combination of two or more mirrors selected from a group

comprising rotary paraboloidal mirror, toroidal mirror, rotary ellipsoidal mirror and rotary hyperbolic mirror.

6 (currently amended): The optical processing apparatus according to Claim 1~~ or 2~~, characterized in that the optics system to focus the ultraviolet light and/or soft X-ray at high energy density in accordance with the wavelength of ultraviolet light and/or soft X-ray is constituted as a Wolter mirror comprising a combination of rotary hyperboloidal mirror and rotary ellipsoidal mirror.

7 (original): An optical processing method characterized by comprising:

focusing and irradiating a laser beam at a light source part onto a target through a light-focusing optics system, and generating ultraviolet light and/or soft X-ray that allows a work to effectively absorb light; and

focusing the ultraviolet light and/or soft X-ray to high energy density in accordance with the wavelength of said ultraviolet light and/or soft X-ray using an ellipsoidal mirror, irradiating the work with the focused ultraviolet light and/or soft X-ray at high energy density in a specified pattern, and processing and/or refining the work.

8 (new): The optical processing apparatus according to Claim 2, characterized in that the optics system to focus the ultraviolet light and/or soft X-ray to high energy density in accordance with the wavelength of ultraviolet light and/or soft X-ray is an ellipsoidal mirror, and that, in the light source part, the generation source of ultraviolet light and/or soft X-ray is positioned at one of the two focal points of the ellipsoidal mirror, and the product of the reflectance on the ellipsoidal mirror surface with respect to the wavelength of ultraviolet light and/or soft X-ray reflected by the ellipsoidal mirror and focused on the other focal point, and the solid angle of the ellipsoidal mirror at the light source part, is set sufficiently large.

9 (new): The optical processing apparatus according to Claim 2, characterized in that the optics system to focus the ultraviolet light and/or soft X-ray at high energy density in accordance with the wavelength of ultraviolet light and/or soft X-ray is an ellipsoidal mirror, and that, in the light source part, the generation source of ultraviolet light and/or soft X-ray is positioned at one of the two focal points of the ellipsoidal mirror, and the product of reflectance R on the ellipsoidal mirror surface with respect to the wavelength of ultraviolet light and/or soft X-ray reflected by the ellipsoidal mirror and focused on the other focal point, and angle ϕ specified by

Equation 7 below at the light source part viewing therefrom both ends of the ellipsoidal mirror in the long axis direction, is set sufficiently large;

where the symbols used in Equation 7 are defined as follows:

θ: Grazing angle of light emitted from the one of the focal points as it enters the ellipsoidal mirror;

w/f: Ratio of the distance between focal points, or 2f, and the length of the ellipsoidal mirror in the rotating axis direction, or 2w;

α: Angle formed by the "rotating axis of the ellipsoidal mirror" and the "straight line passing the one of the focal points of the ellipsoidal mirror and the end point of the ellipsoidal mirror in the rotating axis direction located closer to said focal point";

β: Angle formed by the "rotating axis of the ellipsoidal mirror" and the "straight line passing the one of the focal points of the ellipsoidal mirror and the end point of the ellipsoidal mirror in the rotating axis direction located farther from said focal point";

[Equation 7]

$$\phi = \alpha - \beta$$
$$= \tan^{-1}\frac{\tan\theta\sqrt{1-\left(\frac{w}{f}\right)^2\cos^2\theta}}{1-\frac{w}{f}} - \tan^{-1}\frac{\tan\theta\sqrt{1-\left(\frac{w}{f}\right)^2\cos^2\theta}}{1+\frac{w}{f}}$$

10 (new): The optical processing apparatus according to Claim 2, characterized in that the optics system to focus the ultraviolet light and/or soft X-ray at high energy density in accordance with the wavelength of ultraviolet light and/or soft X-ray is constituted by one mirror or a combination of two or more mirrors selected from a group comprising rotary paraboloidal mirror, toroidal mirror, rotary ellipsoidal mirror and rotary hyperbolic mirror.

11 (new): The optical processing apparatus according to Claim 2, characterized in that the optics system to focus the ultraviolet light and/or soft X-ray at high energy density in accordance with the wavelength of ultraviolet light and/or soft X-ray is constituted as a Wolter mirror comprising a combination of rotary hyperboloidal mirror and rotary ellipsoidal mirror.